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PTO/SB/05 (4/98)
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# UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))

| | |
|---|---|
| Attorney Docket No. | 2270-010 |
| First Inventor or Application Identifier | Gerard J. Barry |
| Title | DYNAMIC CURRENCY CONVERSION...SYSTEMS |
| Express Mail Label No. | EL697038382US |

## APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: Assistant Commissioner for Patents, Box Patent Application, Washington, DC 20231

1. [x] * Fee Transmittal Form *(e.g., PTO/SB/17)* *(Submit an original and a duplicate for fee processing)*
2. [x] Specification [Total Pages 24 ] *(preferred arrangement set forth below)*
   - Descriptive title of the Invention
   - Cross References to Related Applications
   - Statement Regarding Fed sponsored R & D
   - Reference to Microfiche Appendix
   - Background of the Invention
   - Brief Summary of the Invention
   - Brief Description of the Drawings *(if filed)*
   - Detailed Description
   - Claim(s)
   - Abstract of the Disclosure
3. [x] Drawing(s) *(35 U.S.C. 113)* [Total Sheets 10 ]
4. Oath or Declaration [Total Pages 2 ]
   a. [x] Newly executed (original or copy)
   b. [ ] Copy from a prior application (37 C.F.R. § 1.63(d)) *(for continuation/divisional with Box 16 completed)*
      i. [ ] DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).

*NOTE FOR ITEMS 1 & 13: IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY FEES, A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.27), EXCEPT IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.28)*

5. [ ] Microfiche Computer Program *(Appendix)*
6. Nucleotide and/or Amino Acid Sequence Submission *(if applicable, all necessary)*
   a. [ ] Computer Readable Copy
   b. [ ] Paper Copy (identical to computer copy)
   c. [ ] Statement verifying identity of above copies

## ACCOMPANYING APPLICATION PARTS

7. [x] Assignment Papers (cover sheet & document(s))
8. [ ] 37 C.F.R.§3.73(b) Statement *(when there is an assignee)* [ ] Power of Attorney
9. [ ] English Translation Document *(if applicable)*
10. [x] Information Disclosure Statement (IDS)/PTO-1449 [x] Copies of IDS Citations
11. [ ] Preliminary Amendment
12. [x] Return Receipt Postcard (MPEP 503) *(Should be specifically itemized)*
13. [x] * Small Entity Statement(s) *(PTO/SB/09-12)* [ ] Statement filed in prior application, Status still proper and desired
14. [ ] Certified Copy of Priority Document(s) *(if foreign priority is claimed)*
15. [x] Other: Check for $435 for filing fee; Check for $40 for recordation fee.

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[ ] Continuation [ ] Divisional [ ] Continuation-in-part (CIP) of prior application No: _____/_____

*Prior application information:* Examiner _____ *Group / Art Unit:* _____

**For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.**

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|---|---|---|---|
| Name (Print/Type) | Lowell W. Gresham | Registration No. (Attorney/Agent) | 31,165 |
| Signature | Lowell W. Gresham | Date | 11 July 2000 |

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Applicants or Patentees: Gerard J. Barry
Serial or Patent No.: Attorney's
Filed or Issued: Herewith Docket No.: 2270-010
For: ***DYNAMIC CURRENCY CONVERSION FOR CARD PAYMENT SYSTEMS***

**VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(f) and 1.27(b))-INDEPENDENT INVENTOR**

As a below-named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees under section 41(a) and (b) of Title 35, United States Code, to the Patent and Trademark Office with regard to the invention entitled, ***DYNAMIC CURRENCY CONVERSION FOR CARD PAYMENT SYSTEMS***

described in

__X__ the specification filed herewith
_____ application serial no. _____, filed _____
_____ patent no. _____, issued _____

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

_____ no such person, concern, or organization
__X__ persons, concerns or organizations listed below*

*NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

FULL NAME Mainline Corporate Holdings Limited, an Irish Company

ADDRESS Aille, Inverin, Co. Galway, IRELAND
_____ Individual __X__ Small Business Concern _____ Nonprofit Organization

FULL NAME _____

ADDRESS _____
_____ Individual _____ Small Business Concern _____ Nonprofit Organization

FULL NAME _____

ADDRESS _____
_____ Individual _____ Small Business Concern _____ Nonprofit Organization

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b)).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

SOLE or FIRST INVENTOR:

Gerard J Barry

Gerard J. Barry

July 4th 2000

Date

Applicant or Patentee: Gerard J. Barry
Serial or Patent No.: Attorney's
Filed or Issued: Herewith Docket No.:2270-010
For: ***DYNAMIC CURRENCY CONVERSION FOR CARD PAYMENT SYSTEMS***

**VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(f) and 1.27(c))--SMALL BUSINESS CONCERN**

I hereby declare that I am
_____ the owner of the small business concern identified below:
_X_ an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF CONCERN: Mainline Corporate Holdings Limited, an Irish Company
ADDRESS OF CONCERN: Aille, Inverin, Co. Galway, IRELAND

I hereby declare that the above-identified small business concern qualifies as a small business concern as defined in 13 CFR 121.3-18, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees under section 41(a) and (b) of Title 35, United Stated Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the person employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention, entitled ***DYNAMIC CURRENCY CONVERSION FOR CARD PAYMENT SYSTEMS*** by inventor(s) Gerard J. Barry, as described in

_X_ the specification filed herewith
_____ application serial no. _____, filed _____.
_____ patent no. _____, issued _____.

If the rights held by the above-identified small business concern are not exclusive, each individual, concern or organization having rights to the invention is listed below* and no rights to the invention are held by any person other than the inventor, who could not qualify as a small business concern under 37 CFR 1.9(d) or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

*NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

NAME _____

ADDRESS _____
_____ Individual _____ Small Business Concern _____ Nonprofit Organization

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING: John Duffy
TITLE OF PERSON OTHER THAN OWNER: Director
ADDRESS OF PERSON SIGNING:

SIGNATURE John Duffy DATE 4-July-2001

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CIRCULAR ROAD
GALWAY.

07-12-00

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Gerard J. Barry

Serial No.:

Filed: HEREWITH

For: DYNAMIC CURRENCY CONVERSION FOR CARD PAYMENT SYSTEMS

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Assistant Commissioner for Patents
Washington, D.C. 20231

on

11 July 2000
Date

Lowell W. Gresham
Signature

11 July 2000

Respectfully submitted,

Lowell W. Gresham

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Attorney for Applicant
Registration No. 31,165

TITLE OF THE INVENTION

Dynamic Currency Conversion for Card Payment Systems

## BACKGROUND OF THE INVENTION

### Field of the Invention

The present invention relates to Card Payment Systems for use in a multi-currency environment. In particular the present invention provides systems and methods for identifying an appropriate currency for individual transactions conducted using a card payment system.

### Description of the Prior Art

Several types of Card Payment Systems are available, examples of which include credit cards, charge cards and debit cards.

An example structure of a Payment Card System is illustrated in Figure 1 comprising a point of sale terminal 1, an authorisation host 2, a collection/management host 3, transaction collection system 4, a treasury management office 5, a clearing bank 6, a plurality of card schemes 7, and a plurality issuers 8,9. A point of sale terminal 1, according to the prior art is shown in Figure 2, comprising means for accepting payment card details 20. Examples of such means for accepting payment card details include keyboards, magnetic swipe systems, smart card technologies and point-to-point radio transceivers (WO9912136). Alternatively, the terminal may be connected to a communications network, e.g. the Internet, and the means for accepting card details may comprise software which accepts card details forwarded by the cardholder in electronic form, e.g. data posted from a hyper text mark-up language (HTML) form.

A flowchart demonstrating a typical payment transaction as shown in Figure 3, commences with entry of a payment card's details 30, the terminal makes a connection

31 with the authorisation host using its communications hardware and software 22. Typically, this connection 10 is made over a public telephone network or wireless link, any other communications may be used e.g. the Internet. Information concerning the card details and if required the transaction are passed 32 to the authorisation host. The authorisation host checks 33 to confirm that the card details are valid and that the transaction is permitted. If the card details are valid and the transaction value is permitted, the authorisation host sends 34 an authorisation code to the point of sale terminal which then allows 35 the transaction to proceed. Typically a transaction slip is printed 21 for signature by the cardholder, whereas for an Internet transaction a conformational HTML page or e-mail may be forwarded to the cardholder. Optionally, some systems may provide an option 36 enabling a merchant to cancel 37 a transaction at this stage. If the authorisation host decides that the card details are invalid or that the transaction is not permitted then no authorisation code is given and the authorisation host informs 39 the terminal that the transaction is not allowed to proceed. The terminal typically outputs 40 an error message to this effect.

If approved and the transaction is completed, then details of the transaction are stored 38 in the terminal 1 in a transactions table 23.

As required, the terminal connects with the collection host as illustrated in Figure 4 over a communications link 11 and transmits details 43 from the transactions table 1 to the collection host 3. The terminal typically prints a report 44 for the terminal user detailing transactions transmitted. Once all of the transaction details have been communicated the terminal disconnects from the collection host 45.

The terminal is typically controlled by software 24 which is configurable to different situations by means of an alterable configuration file 25.

The transaction details contained in the transaction table are subsequently communicated from the collection host to a transaction collection host 4 which in turn

passes these details onto a clearing bank 6. The clearing bank 6 then sorts the transaction details according to the card scheme used for a transaction. The transaction details are then forwarded to the appropriate card scheme 7, which sorts the transactions according to the card issuers, with transactions concerning a given issuer being passed onto that issuers computer system 8, 9. The issuers in turn assign the details of transactions against a particular card to that card holders account.

An alternative system provides an intermediary called a central payment router which acts as an interface between one or more terminals and the collection and/or authorisation host. This alternative system is typically used in larger retail outlets where there are a large number of terminals. The use of a central payment router provides for greater efficiency, lower overall cost and permits the central collection of transaction details for a merchant, as details do not have to be accumulated manually from each individual terminal.

The exact method or system of conducting or processing transactions may vary considerably from card system to card system, bank to bank or country to country. For example, frequently the authorisation host and collection host are one and the same. Examples of various apparatus, systems and methods for handling card payment transactions include US5678010, US5671285, US5661517, US5448047, US5416306, US5287268, US3723655, US4961142, US4962531, US05386458 and US5826245.

In general, transactions involving a card payment are conducted in the currency of the merchant. Accordingly, if a credit card is used for a purchase in the USA, the currency of the transaction will probably be US$. This restriction can be inconvenient for cardholders travelling abroad, as they are unsure of the exact value (in their own currency) of the transaction. It would be advantageous if a cardholder could make payments in their home currency rather than the currency of the merchant with whom they are conducting the transaction, or view the transaction amount in their own currency for their information.

Furthermore, with the introduction of the EURO, the potential for conducting transactions in the multi-currency environment has increased. Each country participating in the European Monetary Union (EMU) will have in co-existence two currency units the EURO and the national currency for a transition period. As the transition period is quite long, it is inevitable that different issuers and merchants will convert their base currency from the national currency unit to the EURO at different times, with the inevitable result that merchant and consumers may be using different currencies. In addition, the growth of Internet commerce permits consumers to purchase from a greater variety of sources than was previously available. A large proportion of these on-line transactions will be conducted in currencies other than that of the cardholder.

Accordingly, it would be advantageous if a cardholder could view and/or make payments in their home currency rather than the currency of the merchant with whom they are conducting the transaction.

A variety of point of sale and other systems are available which permit multi-currency transactions in which the cardholder may conduct the transaction in the currency of their choice. For example, the Trintech Group(Dublin) provide a compact point of sale terminal and system which facilitates payment by the customer in the currency of their choice at the point of sale. A problem with these existing systems is that the merchant must enter the desired currency for the transaction into the system. In order to do this the merchant must determine the currency of the cardholder and check to see if this currency is permitted. This involves the merchant looking at the card and/or cardholder and attempting a determination of what country the cardholder is from. This determination requires action and some intelligence on the part of the merchant. In addition, with the advent of the Internet the point of sale is the computer, no human merchant may be involved and the payment card is not available for inspection. This also applies for transactions conducted from a distance by other means, e.g. fax or phone.

Accordingly, it would be an advantage if a method and system could be provided for determining the currency of a cardholder at the point of sale automatically, using only a payment card's details.

US5,842,185 discloses a system and method for automatically entering financial transactions such as credit card transactions into a financial account stored in a computer. A financial statement incorporating the transactions is provided in an electronic form understood by the computer, such as a computer data file, for updating the financial account. For a credit card account, the electronic statement includes one or more credit card transactions such as purchases. Before accepting the electronic statement, the process verifies that the electronic form of the statement has not been altered since its creation and therefore correctly reflects transactions in the original statement. In the process of entering the transactions, they are tracked by automatically assigning them to expense categories. First the process determines from the electronic statement if a payee for a transaction is of record in the computer and, if so, assigns the transaction to a category already associated with the payee. If not, the process next determines from the electronic statement a merchant category code such as a Standard Industry Code (SIC). The merchant category code is associated with a category recognised by the computer, and the transaction is assigned to the recognised category. If no recognised category exists, the process prompts the user for a category to which the transaction can be assigned.



## BRIEF SUMMARY OF THE INVENTION

A method for determining a preferred currency for association with a payment card transaction between a merchant and a payment card cardholder comprising the steps of obtaining the card number of the payment card from the cardholder, identifying an issuer code from said card number, determining the operating currency for said issuer code, and setting the currency for association with the payment card transaction as the determined operating currency for the issuer code.

The step of determining the operating currency for the issuer code preferably

comprises the step of comparing the issuer identifier code with entries in a table. The table may contain a number of entries, each entry in the table containing an issuer code and a corresponding currency code. Alternatively, the entries may define ranges of issuer codes, with each range of issuer codes having a corresponding currency code.

The preferred currency is optionally set to default currency of the merchant when no operating currency can be determined for the issuer code.

The card holder may be prompted as to whether the transaction is to be conducted in the preferred currency. This prompting may comprise converting the transaction amounts to equivalent amounts in the preferred currency and presenting these amounts for review by the cardholder and/or presenting an exchange rate to the cardholder, said exchange rate corresponding to a rate between the merchants' currency and the preferred currency. If the cardholder indicates that the transaction is to proceed in the preferred currency, the transaction is processed in the preferred currency and/or if the cardholder indicates that the transaction is not to proceed in the preferred currency, the transaction proceeds in the merchants currency.

One or more of the transaction amounts may be converted to an equivalent amount in the preferred currency and presented to the cardholder. An exchange rate corresponding to a rate between the merchants' currency and the preferred currency may also be presented to the cardholder. These transaction details may be presented along with or instead of the merchants currency to the cardholder. The transaction details may be presented to the cardholder after cardholder approval has been obtained for the transaction and/or beforehand. In either case the amounts presented may be for information purposes only for the cardholder, based on nominal exchange rates.

Optionally, an initial check may be made to determine if the transaction amount exceeds a predetermined minimum level for processing in an alternative currency to that of the merchants currency.

Preferably, the steps of the method of the invention are performed substantially in an automatic fashion without input from the terminal operator.

The method is suitable for implementation on a payment card terminal, authorisation host, a central payment router or a combination of these devices.

The above method may also be extended to payment card transactions made over a computer network, for example the Internet, for example for e-commerce type transactions.

In one embodiment an apparatus is provided having means for determining a preferred currency for association with a payment card transaction between a merchant and a payment card cardholder, said means comprising; means for obtaining the card number of the payment card from the cardholder, means for identifying an issuer code from said card number, means for determining the operating currency for said issuer code, and means for setting the currency for association with the payment card transaction as the determined operating currency for the issuer code.

The apparatus further comprises means for comparing said issuer identifier code with entries in a table. Each entry in the table may contain an issuer code and a corresponding currency code. Alternatively, the entries in the table may define a range of issuer codes, with each range of issuer codes having a corresponding currency code.

The apparatus may comprise means for setting the preferred currency to the default currency of the merchant when no operating currency can be determined for the issuer code.

A prompting means may be provided for prompting the cardholder as to whether the transaction is to be conducted in the preferred currency. This prompting means may comprise conversion means for converting the transaction amounts to equivalent amounts in the preferred currency and presenting these amounts for review by the cardholder. The prompting means may optionally further comprise a means for

presenting an exchange rate to the cardholder, the exchange rate corresponding to a rate between the merchants' currency and the preferred currency.

An additional means may be provided for accepting an indication from the cardholder as to whether the transaction is to proceed in the preferred currency and means for permitting the transaction to be processed in the preferred currency if such an indication is received and/or permitting the transaction to be processed in the merchant's currency if no such indication is received.

Preferably, the apparatus is adapted to present at least one of the transaction amounts in an equivalent amount in the preferred currency to the cardholder and/or with an exchange rate corresponding to a rate between the merchants' currency and the preferred currency.

The apparatus may be adapted to present these details to the cardholder before and/or after cardholder approval has been obtained for the transaction.

Optionally, means may be provided for initially checking to determine if the transaction amount exceeds a predetermined minimum level for processing in an alternative currency to that of the merchants currency.

The apparatus may be implemented in a variety of embodiments, for example within a payment card terminal, a central payment router, an authorisation host, an authorisation host in co-operation with a payment card terminal, or an authorisation host in co-operation with a payment router.

In one embodiment, the apparatus comprises means for connecting to a node in a computer network. Preferably in this embodiment, the card number is received via the computer network. This embodiment is particularly suited to e-commerce type transactions.

According to the invention, there is provided a method and system for determining the currency of a cardholder at the point of sale automatically.

According to the invention, there is provided a transaction capture system for payment cards which automatically converts the transaction currency to that of the card issuers currency.

## BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows a block diagram of a payment card scheme arrangement according to the prior art.

Figure 2 is a payment card point of sale terminal according to the prior art.

Figure 3 is a flowchart demonstrating a typical authorisation request procedure according to the prior art.

Figure 4 is a flowchart illustrating a typical procedure for communicating transaction details to a collection host according to the prior art.

Figure 5 is a flowchart of a method according to the present invention.

Figure 6 depicts an example of a bank reference table according to the present invention.

Figure 7 illustrates a point of sale terminal according to the invention for use in a retail outlet.

Figure 8 is a flowchart showing the steps of a method according to an embodiment of the present invention performed on a point of sale terminal as shown in figure 8.

Figure 9 is a flowchart of a 'batch-in' process according to an embodiment of the invention for use with a point of sale terminal as shown in Figure 7.

Figure 10 is a flowchart illustrating the steps of another method for determining an associated currency and processing same according to the present invention.

## DETAILED DESCRIPTION OF THE DRAWINGS

A flowchart of the operation of the present invention is illustrated in Figure 5, in which an identifier code is extracted 50 from the payment card details. In the preferred embodiment, the identifier code consists of a portion of the payment card number.

Typically, payment card issuers are assigned a range of card numbers for issuing cards to customers. For example a small bank may be assigned the range 4555999033300000 to 45550999033399999, whereas a larger bank may be assigned 4555998800000000 to 4555998819999999. Accordingly, the identifier code is the portion of a card number, which distinguishes between issuers.

The identifier code is compared 51 with entries in a bank reference table (an example of which is shown in Figure 6), which contains a list of issuer identifier codes . Each issuer identifier code 60(1-n) in the table has an associated entry 61(1-n) containing an associated currency, which corresponds to the currency of payment cardholders accounts of the issuer. For example, if the issuer is an Irish Bank then the associated currency may be Irish Pounds or EUROs, similarly if the issuer is a UK bank then the associated currency is probably pounds Sterling. The bank reference table may be created from a number of sources, including the card scheme administration organisations or from data collected from a large number of cardholders.

If no entry is found in the bank reference table for the identifier code of the issuer of the card, then the transaction will be processed 53 as before in the prior art. If an entry is found for the identifier code, the associated currency corresponding to the issuer code is extracted and the transaction is processed with enhanced functionality 54 using the associated currency. A variety of enhancements are available, when the currency of the payment cardholders account is known.

For example, the transaction may be processed in the associated currency, as the amount of the transaction amount in the associated currency may be shown to the customer for informational purposes, a receipt could be printed showing the local currency and the associated currency equivalent, or a combination.

If the enhancements are performed at the terminal and involve a currency conversion, then currency exchange rates will be required. These currency exchange rates may be stored at the terminal and updated as required or they may be obtained from elsewhere, for example the authorisation host.

These enhancements may be provided as optional features, for example the merchant could inform the cardholder that the transaction may be conducted in the associated currency if desired. If the cardholder then so elects, then the transaction may be processed in the associated currency, otherwise the transaction is processed in the merchants currency. Alternatively, the enhancements could be made mandatory in the sense that the enhancements are performed in all cases. The cardholder is not given a choice.

Furthermore, the steps of the method illustrated in Figure 5 may be implemented at several different stages of the transaction. For example, the steps of extraction 50, determination 51,52 and processing with enhancements 54 may be performed before the terminal connects to the authorisation host 2 (if the terminal connects to the authorisation host at all) or at any stage thereafter prior to completion of the transaction. Similarly, the steps of extraction 50, determination 51,52 and processing with enhancements 54 may be performed at the terminal, at the authorisation host, or at a combination of the two, for example the terminal may identify the associated currency and the authorisation host may perform the enhanced processing or vice versa.

It will be understood therefore that the software and/or hardware for performing the steps according to the invention may be located at a terminal, payment router or an authorisation host or any combination of these.

An example of a point of sale terminal according to one embodiment of the invention embodiment is illustrated in Figure 7. The terminal 70 is suitable for use in the retail environment, e.g. shops, restaurants and hotels. The terminal 70 permits a merchant to offer a cardholder the option to pay for goods and/or services in the

currency of the cardholder's card. The terminal 70 records the amount due to the merchant in their domestic currency. The terminal 70 then forwards the transactions for settlement to the appropriate settlement partner. In the event that the terminal 70 is unable to determine the currency of a card, the transaction will be processed in the currency of the merchant.

The terminal comprises a magnetic strip reader 71, an Alphanumeric and Function Keypad 72, a Display Unit 75, and a Receipt Printer 74 for printing receipts 73. Card details are entered either by swiping a payment card through magnetic strip reader 71 or using the keypad 72. Transaction details are entered using the keypad 72. Optionally, a Personal Identification Number (PIN) key pad (not shown) may be provided to allow a cardholder to enter a password. Internally, the terminal has suitable electronic circuitry for operating the terminal, typically comprising a Modem, a Power Supply Unit, Microprocessor, RAM and ROM Memory.

The circuitry and elements are preferably arranged to produce a terminal that has a small footprint and is compact.

The terminal software comprises of code which carries out the following functions; modem control, card reading, operator interface, authorisation, abbreviated bank reference table management, currency rate management, terminal configuration, printer control, authorisation/collection host communication, reporting and batching.

The modem control function is responsible for formatting data for transmission, removing formatting from received data, and operating the modem. The card reading function receives data from the magnetic strip reader and extracts the card details from this data. The operator interface receives data from the keypads, responds to the data and outputs messages to the display unit when required. The authorisation function is responsible for generating and sending an authorisation request to the authorisation host and for processing an authorisation or rejection code received from the host. The bank reference table is a table that stores the leading digits of individual issuers of credit/debit cards in the world and identifies an associated currency code for each

issuer. The currency rate management is responsible for determining an appropriate exchange rate for a transaction and for maintaining a table of exchange rates. The terminal configuration function is used to enable a terminal to be configured for individual merchants, locations different merchants, etc. by permitting modification of a number of parameters. Examples of these parameters may include one or more of the following; Minimum Transaction Value for Conversion, Maximum Transaction Value for Conversion, Authorisation Limit/ Floor Limit, Correct Date, Correct Time, Maximum Time between Batch-Ins, Host Identification Number, 1st System Host Telephone Number, 2nd System Host Telephone Number, 1st Authorisation Telephone Number, 2nd Authorisation Telephone Number, Next System Batch Number, Modem Speed, Base Currency Code, Merchant Master Number, Merchant Currency Numbers and Terminal Identification code. In order to operate correctly the terminal must be configured with all of these parameters. However, the terminal may operate in a limited fashion if a reduced number of parameters have been entered. Additional parameters to process an individual transaction may also have to stored before the transaction may be processed, e.g. an appropriate Bank reference Table and/or the currency rates for the transaction date. The printer control function formats data and outputs the formatted data to the printer as required. The authorisation/collection host communication function controls the interaction of the terminal with authorisation and communication hosts. The reporting and batching function stores the transactions as they are entered and the collates them and forwards the resulting collated data to the collection host when the collection host is connected to the terminal.

In order for the terminal to operate properly, one or more of the following may be required; a connection to a standard PSTN dial-out telephone line, paper in the printer, an operating environment which is dry and of normal humidity and a connection to a mains supply voltage.

In operation, the terminal initially connects to a host and downloads the latest version of the terminal software as well as its standard configuration information. As soon as this download is complete the terminal will automatically dial the authorisation/collection host and collect the latest version of the Bank reference Table.

The terminal downloads the currency rates to be applied over a future period. For each currency that the system is to convert a date, currency code and rate are downloaded. A report detailing rates received is printed. Once these tables have been received the System is ready to process transactions.

A typical transaction cycle is now described, commencing when the cardholder offers their payment card to the merchant as a means of payments for goods or services. The merchant typically swipes 205 the card in the magnetic stripe reader of the point of sale terminal. The reader extracts 205 the card number, expiry date and the name of the cardholder from the card.

The terminal software searches through the Bank Reference table and checks 210 for an entry corresponding to the issuer code obtained from the card number. If an entry is found the currency for the transaction is set 215 to that of the payment card. If no entry in the Bank Reference table is found the currency is set 220 to that of the merchant.

The terminal then requests 225 the amount of the transaction in the currency of the merchant which is keyed in using the numeric keypad. Alternatively, a connection may be provided to a cash register or other device to obtain directly the transaction total.

Optionally, the System may check to determine whether the transaction value in the Merchants currency is within the minimum 240 and maximum range 230 contained in the Systems configuration table. If the amount falls within the range it is processed in the cardholders currency transaction 245. If it is above or below the limit it is processed in the currency of the merchant 255.

For transactions processed in the cardholders currency as opposed to the merchants currency, the terminal 70 displays 265 the Cardholders Currency Code, the currency conversion rate and the amount in the cardholder's own currency. The cardholder decides 270 whether to consent to or reject the offer. If the offer is rejected

the System may revert 255 to the Merchants currency amount. The cardholder may cancel the entire transaction regardless of whether the transaction is processed in the merchants or cardholders currency as in existing systems.

If the cardholder consents the transaction will be processed 275 in the currency of the card holder.

After determining the currency of the transaction, the terminal proceeds to determine if an Authorisation Code is required (not shown). This is determined by comparing the value of the transaction in the merchants currency against the pre-configured floor limit. If the value of the transaction is above the floor limit an Authorisation Code is sought.

The Terminal System Software initiates the modem and obtains a dial-out line and attempts to call the 1st Authorisation Host Number. If a connection is not received after a pre-configured number of attempts the System will attempt to place the call using the 2nd Authorisation Host Number.

If no connection is obtained to either Authorisation Host the transaction is rejected and a printed slip detailing the failure to connect to the Host is produced.

If a connection to an Authorisation Host is made, the communications software within the terminal establishes its identity with the Authorisation Host using industry standard protocols for such communications. The Terminal transmits the identity of the terminal, the Card Number, The Merchant Number for that currency and the value. The Authorisation Host can reject the transaction or respond with an Authorisation Number which is received and stored by the System. Once the Authorisation Code has been received the System disconnects from the Host and produces 260 a Transaction Slip typically detailing the following; Name and Address of the Merchant, Merchant ID, Terminal Number, Date & Time of the transaction, Cardholders Card Number, Authorisation Code, Transaction Values in the Merchant Currency, Transaction Value in Cardholders Currency, and area against, upon which the cardholder must sign

consenting to the transaction. Similar details excluding the space for signature are stored in the transaction table.

A copy is produced for the merchant and the cardholder. After which, the transaction is completed between the cardholder and the merchant.

At the end of each day the merchant can press a key to instruct the terminal to carry out a 'Batch-In' of the accumulated transactions to the Collection Host, the process of which is illustrated in Figure 9, i.e. forward details of the transactions that have accumulated since the previous 'Batch-In' to the collection host. If the merchant does not manually request a 'Batch-In' process, a pre-configured parameter will detect the absence of a Batch-In and will automatically initiate 300 a Batch-In, the first step of which involves connecting 301 to the collection host.

During a 'Batch In', any transactions which have been processed by the terminal are collated and transmitted 302 to the Collection Host and a report is printed 303 summarising the transactions which have been forwarded in the transmission.

It will be appreciated by those skilled in the art, that in order to forward the transaction details to the clearing bank, some processing will be required to convert the details into a form which is usable by the clearing bank. This processing may be performed at the collection host or alternatively data may be forwarded to a back office for processing, illustrated as the transactions collection system in Figure 1.

When the transaction have been successfully transmitted, the terminal will seek 304 any amendments to the bank reference table. Additions and deletions to the bank reference table are received and processed by the terminal.

After the bank reference table has been appropriately modified 305 the terminal will seek to update 307 its Currency Rates by obtaining 306 revised rates from the collection host. This update 307 will remove any expired rates and receive any new

future rates. When the rates have been updated, a print out 308 is made of the new rates to be applied to future transactions.

At this point the terminal will disconnect 309 from the Collection Host. The batch-in is completed 310 and the terminal is ready to process further transactions.

It will be appreciated by those skilled in the art, that in order to forward the transaction details to the clearing bank, some processing will be required to convert the details into a form which is usable by the clearing bank. This processing may be performed at the collection host or alternatively data may be forwarded to a back office for processing, illustrated as the transactions collection system in Figure 1.

An alternative embodiment is where the determination of the currency for a transaction is performed on the authorisation host. A flowchart of a method according to this embodiment is shown in Figure 10. The operation is started 400 when a connection is made by a terminal to the authorisation host. Once a valid connection has been established, the terminal forwards 405 an authorisation request, containing card details and the transaction amount, to the authorisation host. The Authorisation host checks 410 to determine whether the transaction is to be authorised or not, if the transaction is not permitted a cancellation code is sent 415 to the merchant's terminal which prints 420 a transaction slip showing that the transaction is not permitted. If the transaction is authorised, the Authorisation host extracts the issuer code from the payment card details and checks 425 the extracted issuer code against entries in the bank reference table. If no entry is found in the bank reference table or if the currency associated with the issuer is the same as that of the merchant then the transaction details are unchanged and forwarded 435 back to the terminal along with the authorisation code. Alternatively, the host may simply send the authorisation code as the terminal already has the transaction details. If an entry is found in the bank reference table and the currency associated with the issuer is different from that of the merchant, the transaction amount is converted 420 to an equivalent amount in the associated currency. This converted amount and the associated currency code are forwarded 435, along with an authorisation code to the terminal. Optionally, the currency exchange rate

used may also be forwarded. The terminal prints a transaction slip 440 showing the transaction amount in the associated currency and the associated currency code, which may be signed by the cardholder. The transaction slip may also show the merchants currency equivalent and the currency exchange rate used.

As with the previous embodiment, the terminal subsequently connects to the connection host and performs a batch-in.

It will be apparent to the skilled person in the art that the present invention can be implemented in most payment card systems and that the currency identification can be implemented at different stages of transactions. Accordingly, the foregoing description is by way of example only and is not intended as limiting. The present invention is only limited by the claims appended hereto and their equivalents. It will be understood by the skilled person in the art that a wide variety of embodiments are available which come within the spirit and scope of the present invention.

**I Claim:**

1. A method for determining a preferred currency for association with a payment card transaction, the payment card having a card number, between a merchant and a payment card cardholder comprising the steps of;
obtaining the card number of the payment card from the cardholder,
identifying an issuer code from said card number,
determining the operating currency for said issuer code, and
setting the currency for association with the payment card transaction as the determined operating currency for the issuer code.

2. A method according to claim 1, wherein said step of determining the operating currency for said issuer code comprises the step of comparing said issuer identifier code with entries in a table wherein each entry in the table containing an issuer code or range of issuer codes and a corresponding currency code.

3. A method according to claim 1, wherein the preferred currency is set to default currency of the merchant when no operating currency can be determined for the issuer code.

4. A method according to claim 1, wherein the card holder is prompted as to whether the transaction is to be conducted in the preferred currency, including the steps of converting the transaction amounts to equivalent amounts in the preferred currency and presenting these amounts for review by the cardholder and/or presenting an exchange rate to the cardholder, said exchange rate corresponding to a rate between the merchants' currency and the preferred currency.

5. A method according to claim 1, wherein at least one of the transaction amounts is converted to an equivalent amount in the preferred currency and is presented to the cardholder.

6. A method according to claim 5, further comprising the step of presenting an exchange rate to the cardholder, said exchange rate corresponding to a rate between the merchants' currency and the preferred currency.

7. A method according to claim 5, wherein the transaction details in the merchants currency are also presented to the cardholder.

8. A method according to claim 1, further comprising the step of initially checking to determine if the transaction amount exceeds a predetermined minimum level for processing in an alternative currency to that of the merchants currency.

9. A method according to claim 1, wherein said method is a data processing method.

10. A data processing system for determining a preferred currency for association with a payment card transaction, the payment card having a card number, between a merchant and a payment card cardholder, said means comprising;
means for obtaining the card number of the payment card from the cardholder,
means for identifying an issuer code from said card number,
means for determining the operating currency for said issuer code, and
means for setting the currency for association with the payment card transaction as the determined operating currency for the issuer code.

11. A data processing system according to claim 10, wherein said means for determining the operating currency for said issuer code comprises means for comparing said issuer identifier code with entries in a table, wherein each entry in the table contains an issuer code or range of issuer codes and a corresponding currency code.

12. A data processing system according to claim 10, further comprising means for setting the preferred currency to the default currency of the merchant when no operating currency can be determined for the issuer code.

13.A data processing system according to claim 10, further comprising prompting means for prompting the cardholder as to whether the transaction is to be conducted in the preferred currency, said prompting means optionally comprising conversion means for converting the transaction amounts to equivalent amounts in the preferred currency and presenting these amounts for review by the cardholder and/or means for presenting an exchange rate to the cardholder, said exchange rate corresponding to a rate between the merchants' currency and the preferred currency.

14.A data processing system according to claim 13, further comprising means for accepting an indication from the cardholder as to whether the transaction is to proceed in the preferred currency and means for permitting the transaction to be processed in the preferred currency if such an indication is received.

15.A data processing system according to claim 10, further comprising conversion means for converting at least one of the transaction amounts to an equivalent amount in the preferred currency and presenting this converted amount to the cardholder, optionally comprising means for presenting an exchange rate to the cardholder, said exchange rate corresponding to a rate between the merchants' currency and the preferred currency.

16.A data processing system according to claim 10, further comprising means for initially checking to determine if the transaction amount exceeds a predetermined minimum level for processing in an alternative currency to that of the merchants currency.

17.A data processing system according to claim 10, wherein said data processing system is embodied in a payment card terminal.

18.A data processing system according to claim 10, wherein said data processing system is embodied in a central payment router.

19.A data processing system according to claim 10, wherein said data processing system is embodied in an authorisation host, optionally in co-operation with another system.

20.A data processing system according to claim 10, wherein said other system is a payment card terminal or central payment router.

21.A data processing system according to claim 10, further comprising means for connecting to a node in a computer network.

22.A data processing system according to claim 21, wherein the card number is received via the computer network.

23.A computer program encoding a set of computer instructions for use in a computing device for determining a preferred currency for association with a payment card transaction, the payment card having a card number, between a merchant and a payment card cardholder, comprising a computer code section which when executed on the computing device obtains the card number of the payment card from the cardholder,

a computer code section which when executed on the computing device identifies an issuer code from said card number,

a computer code section which when executed on the computing device determines the operating currency for said issuer code, and

a computer code section which when executed on the computing device sets the currency for association with the payment card transaction as the determined operating currency for the issuer code.

24. A computer program encoding a set of computer instructions according to Claim 23 comprising a computer code section which when executed compares said issuer identifier code with entries in a table wherein each entry in the table contains an issuer code or range of issuer codes and a corresponding currency code.

25. A computer program according to claim 23, comprising a computer code section which when executed on the computing device sets the preferred currency to the default currency of the merchant when no operating currency can be determined for the issuer code.

26. A computer program according to claim 23, having a computer code section which when executed on the computing device prompts the card holder as to whether the transaction is to be conducted in the preferred currency, including converting the transaction amounts to equivalent amounts in the preferred currency and presenting these amounts for review by the cardholder and/or presenting an exchange rate to the cardholder, said exchange rate corresponding to a rate between the merchants' currency and the preferred currency.

27. A computer program according to claim 23, comprising a computer code section which when executed on the computing device converts at least one of the transaction amounts to an equivalent amount in the preferred currency and presents the converted amount to the cardholder.

28. A computer program according to claim 27, comprising a code section which when executed on the computing device presents an exchange rate to the cardholder, said exchange rate corresponding to a rate between the merchants' currency and the preferred currency.

29. A computer program according to claim 27, comprising a computer code section which when executed on the computing device presents the transaction details in the merchants currency to the cardholder.

30. A computer program according to claim 23, comprising a code section which when executed on the computing device initially checks to determine if the transaction amount exceeds a predetermined minimum level for processing in an alternative currency to that of the merchants currency.

ABSTRACT

DYNAMIC CURRENCY CONVERSION FOR CARD PAYMENT SYSTEMS

The present invention relates to Card Payment Systems for use in a multi-currency environment. In particular, the present invention provides a system and method for identifying an appropriate currency for individual transactions conducted using a card payment system, using the steps of identifying (**50**) an identifier code (**60(1-n)**) from a payment card, and determining (**52**) from the identifier code (**60(1-n)**) a suitable currency (**61(1-n)**) for association with said payment card transaction. The identifier code is preferably a portion of the card number of the payment card. The transaction may be processed (**54**) in the suitable currency or the transaction amounts may be displayed in the suitable currency for information purposes.

[Figure 5]

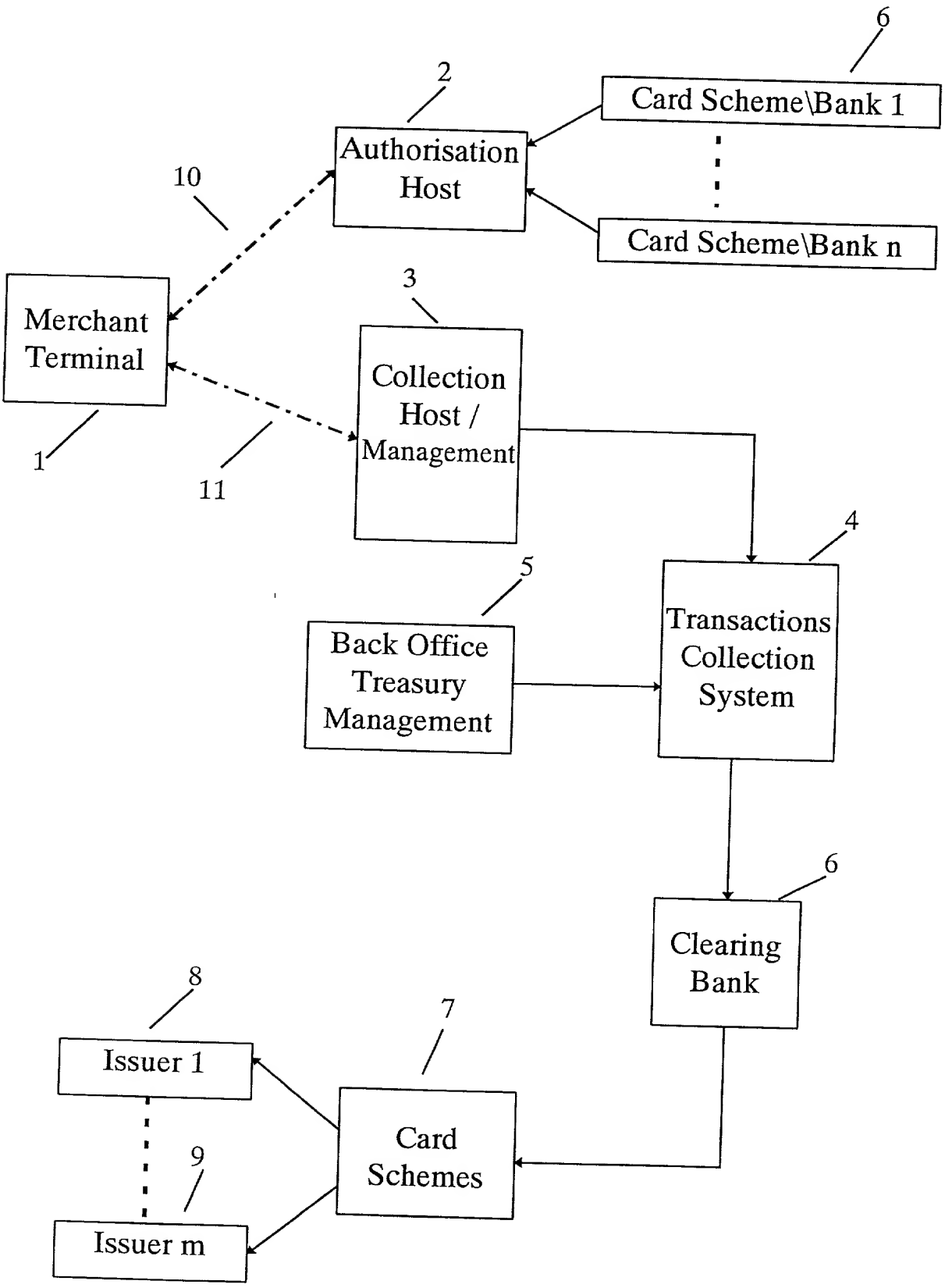
6
2
Card Scheme\Bank 1
Authorisation Host
10
Card Scheme\Bank n
3
Merchant Terminal
Collection Host / Management
1
11
4
5
Back Office Treasury Management
Transactions Collection System
6
Clearing Bank
8
7
Issuer 1
Card Schemes
9
Issuer m

**Figure 1**

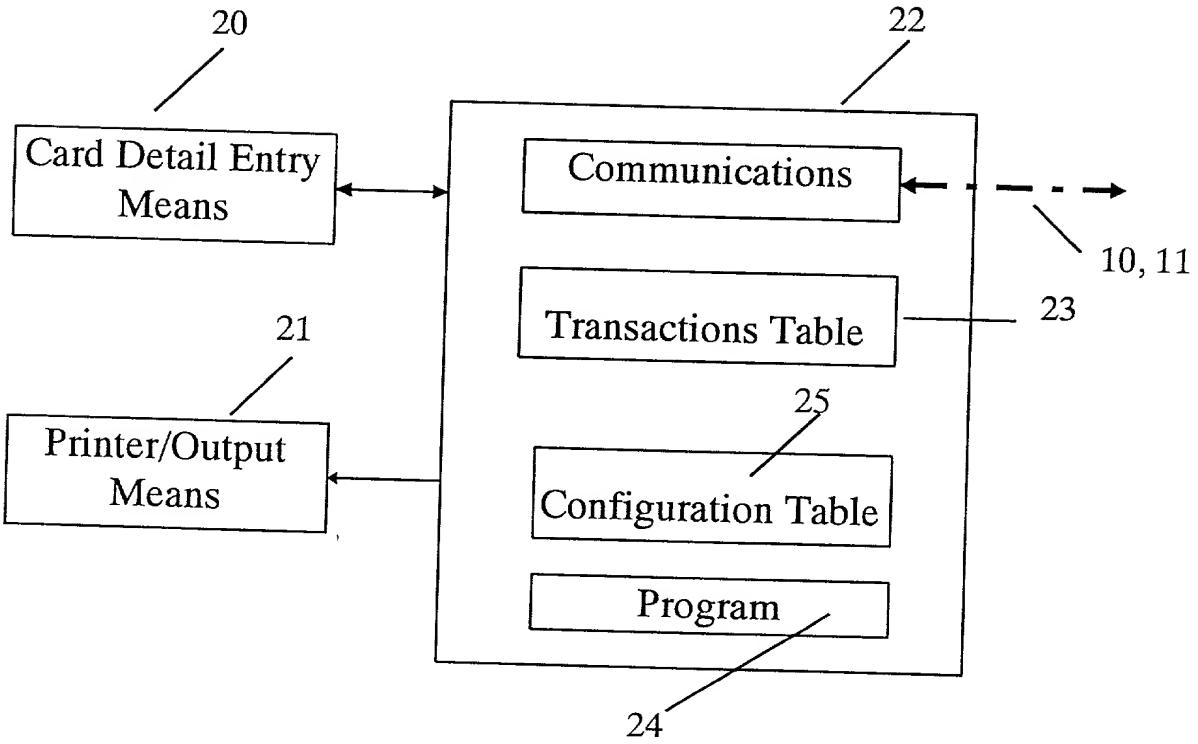


**Figure 2**

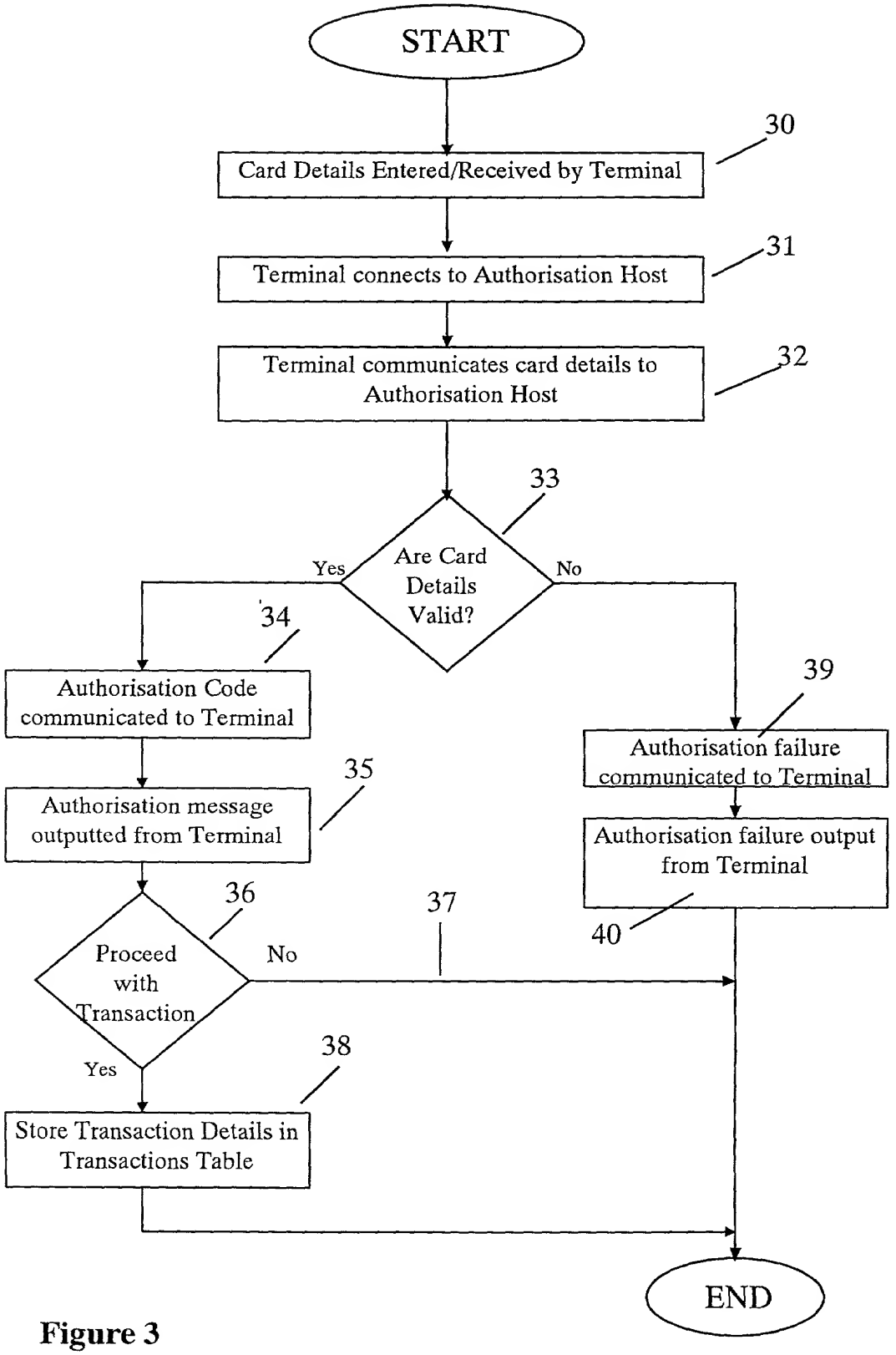
START
30
Card Details Entered/Received by Terminal
31
Terminal connects to Authorisation Host
32
Terminal communicates card details to Authorisation Host
33
Are Card Details Valid?
Yes
No
34
Authorisation Code communicated to Terminal
35
Authorisation message outputted from Terminal
36
Proceed with Transaction
Yes
No
37
38
Store Transaction Details in Transactions Table
39
Authorisation failure communicated to Terminal
Authorisation failure output from Terminal
40
END

**Figure 3**

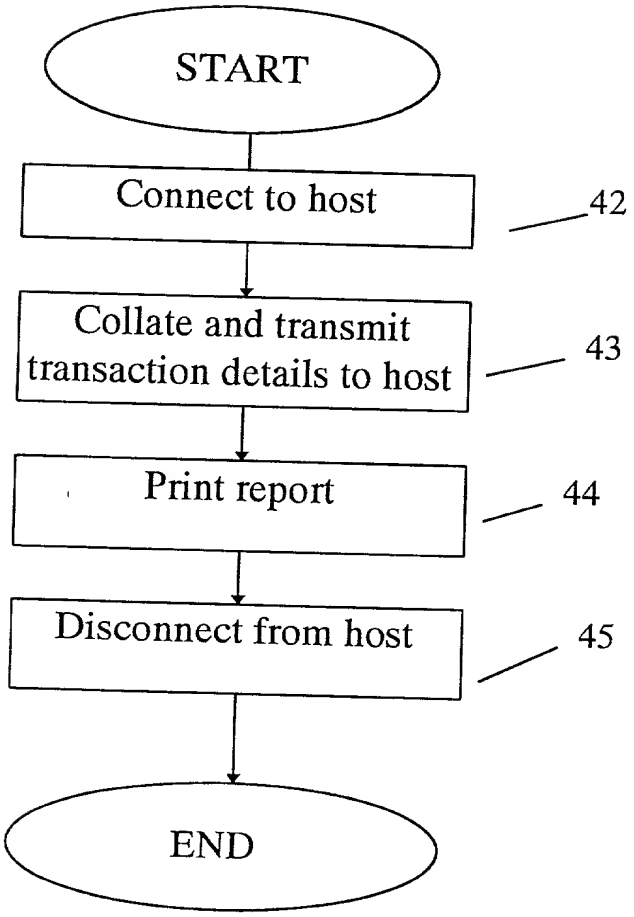
START
Connect to host
42
Collate and transmit transaction details to host
43
Print report
44
Disconnect from host
45
END

**Figure 4**

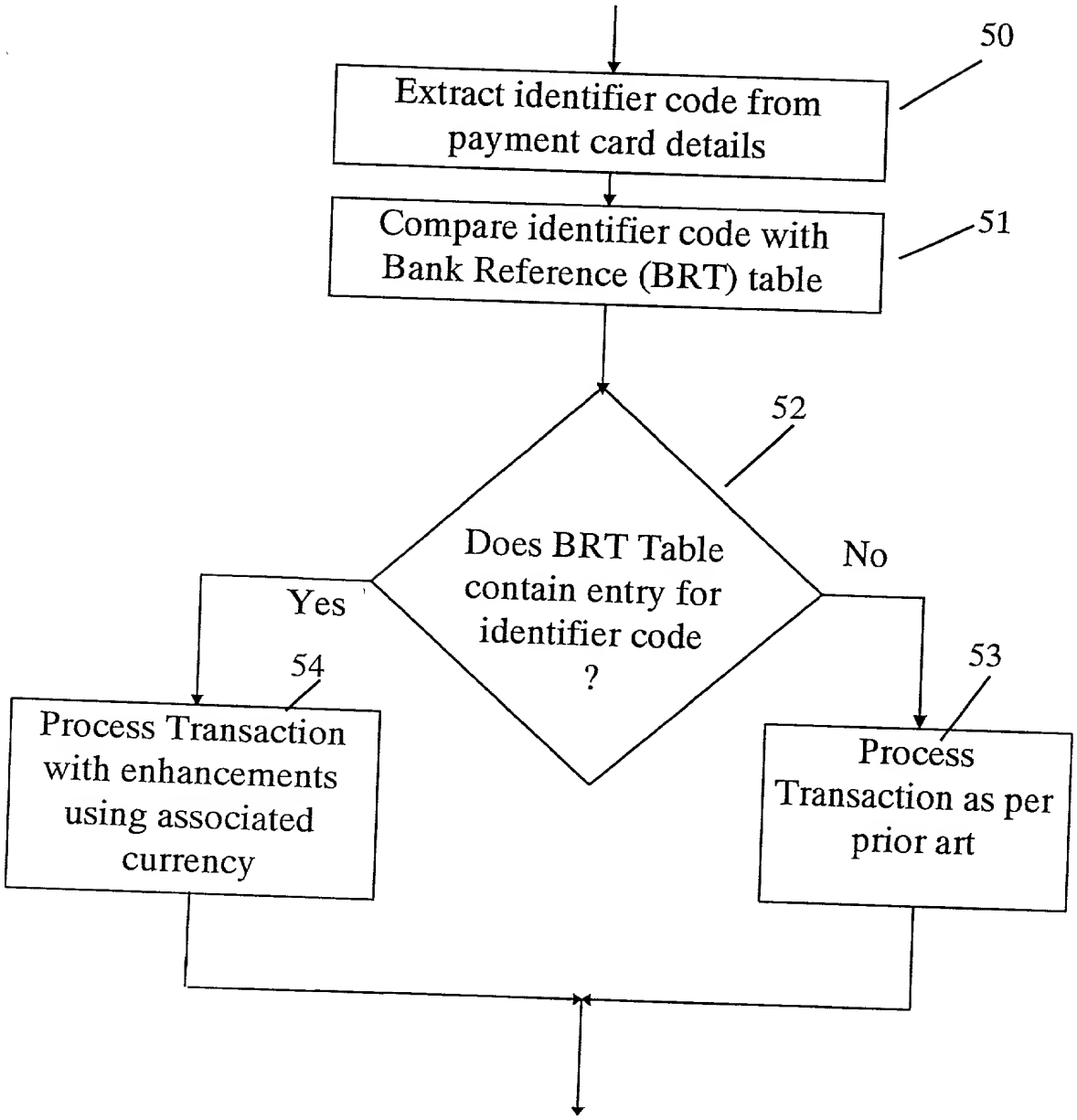
Extract identifier code from payment card details
50
Compare identifier code with Bank Reference (BRT) table
51
Does BRT Table contain entry for identifier code ?
52
Yes
No
Process Transaction with enhancements using associated currency
54
Process Transaction as per prior art
53

Figure 5

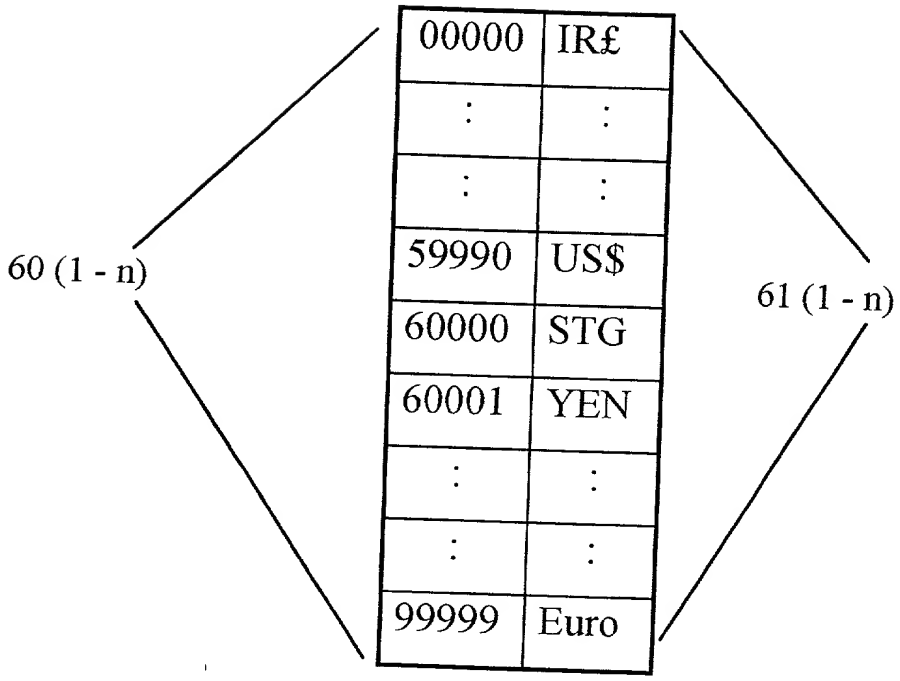


**Figure 6**

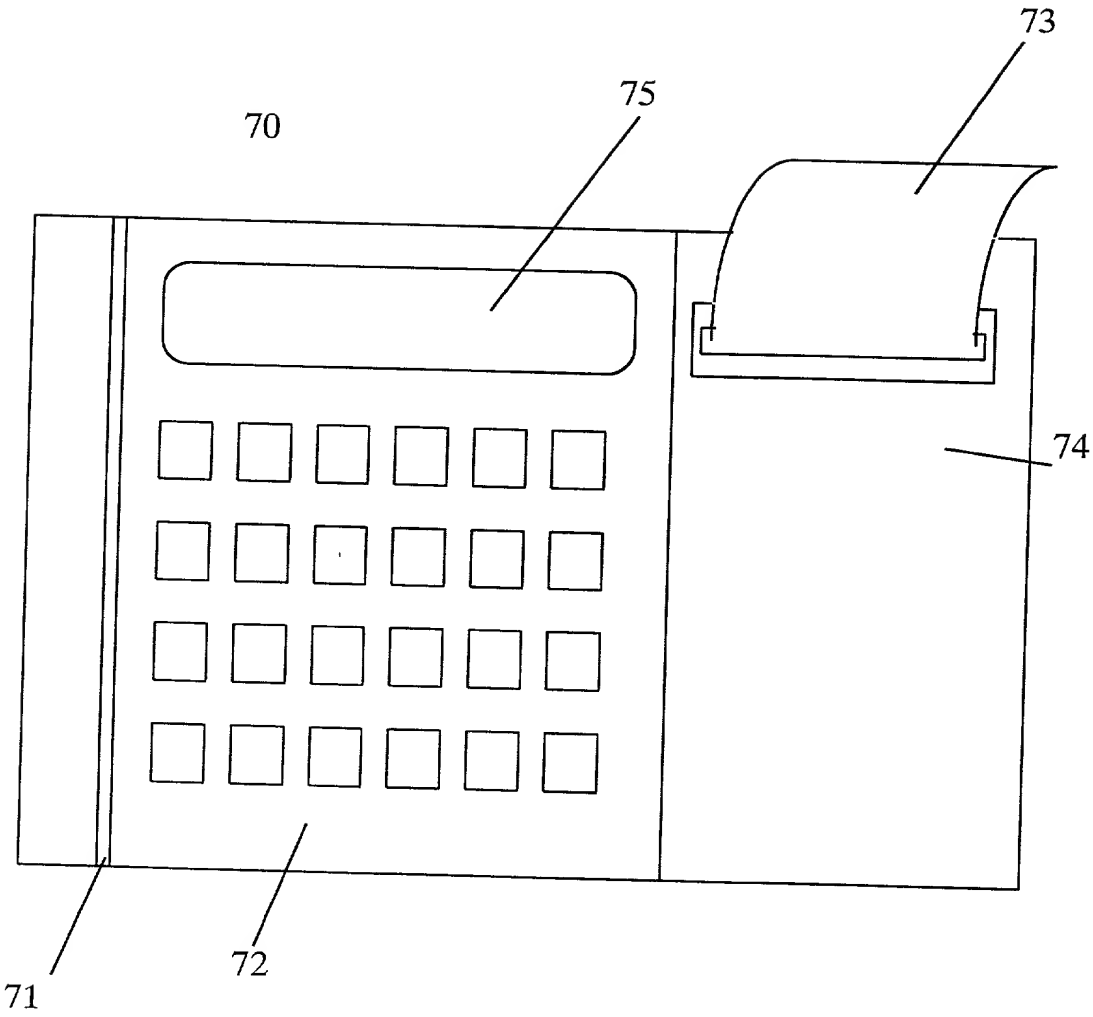


**Figure 7**

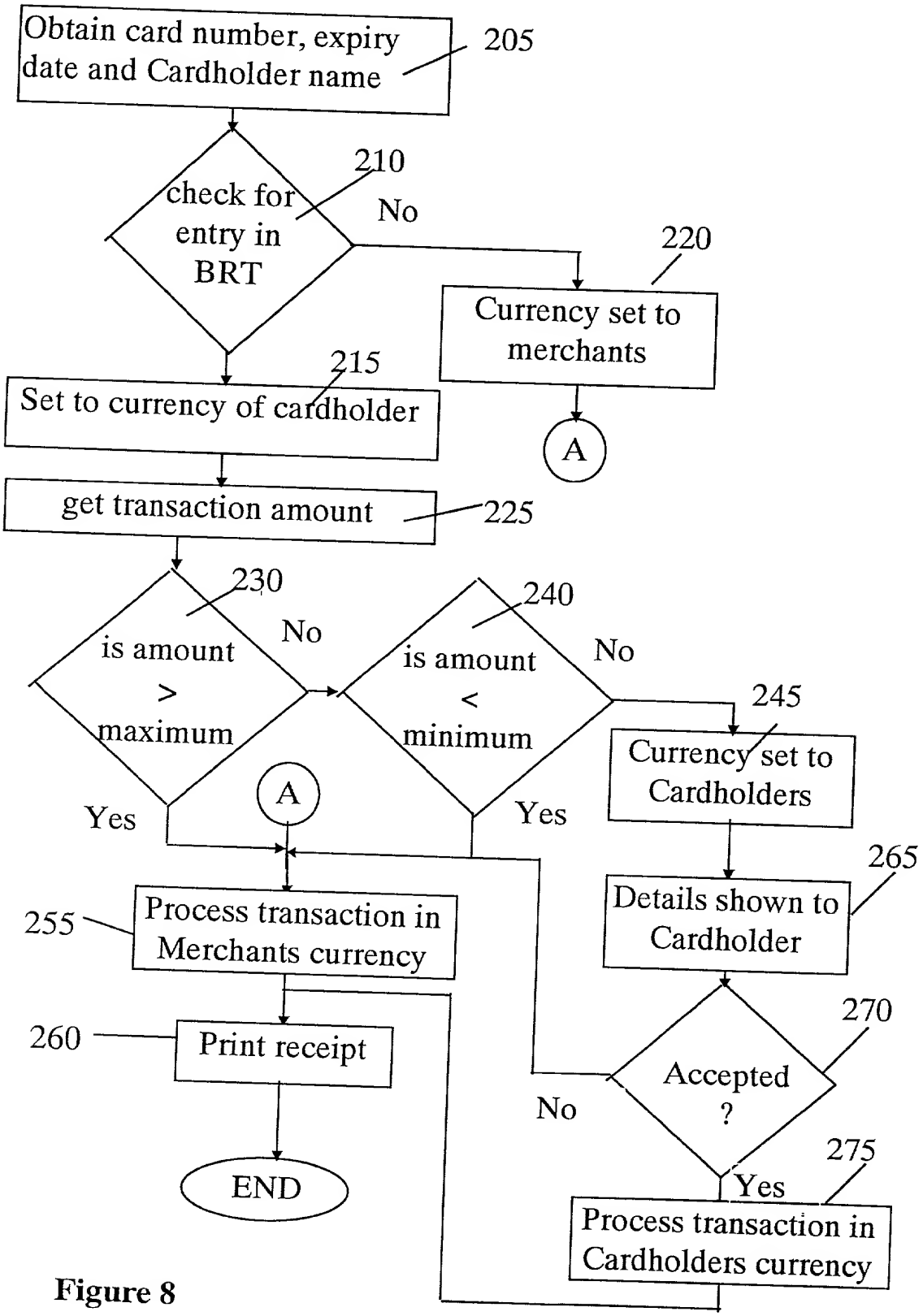
Obtain card number, expiry date and Cardholder name
205
check for entry in BRT
210
No
220
Currency set to merchants
215
Set to currency of cardholder
A
get transaction amount
225
230
is amount > maximum
No
240
is amount < minimum
No
245
Currency set to Cardholders
Yes
A
Yes
265
Details shown to Cardholder
255
Process transaction in Merchants currency
270
Accepted ?
No
260
Print receipt
END
275
Yes
Process transaction in Cardholders currency

**Figure 8**

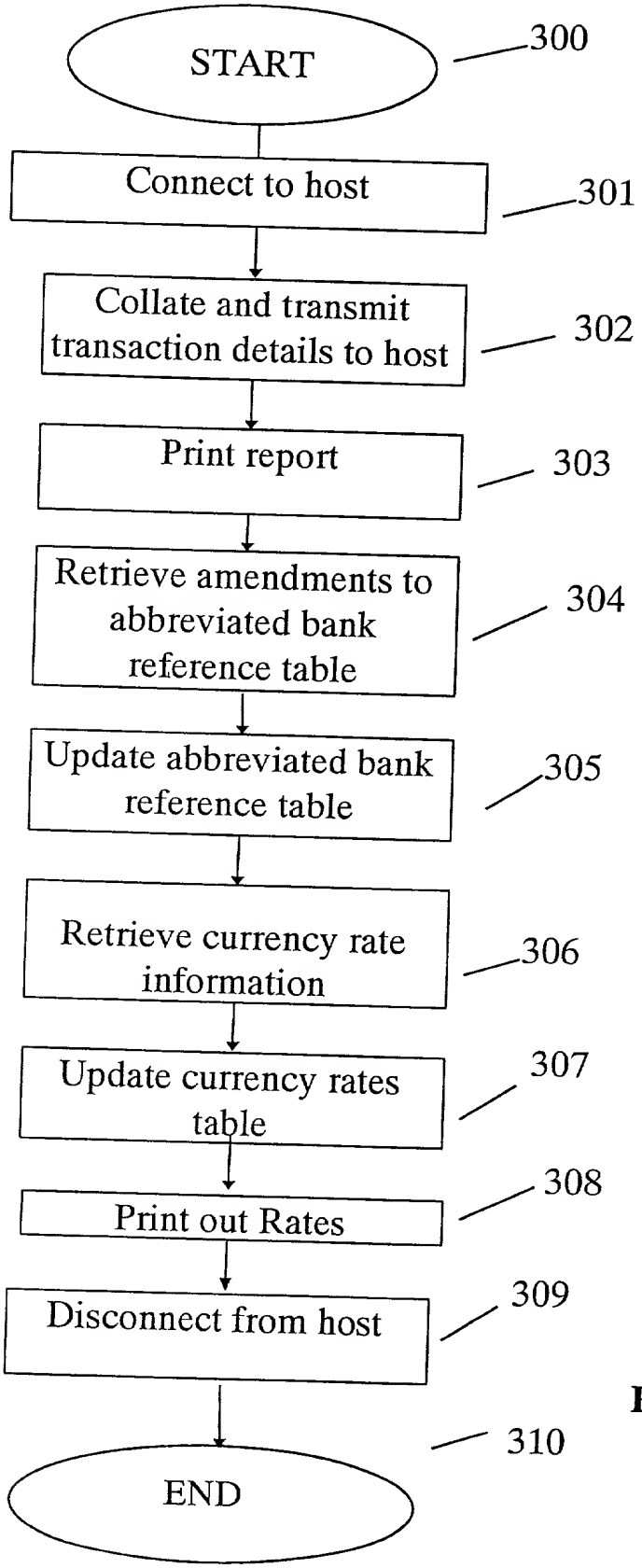


**Figure 9**

djc2340

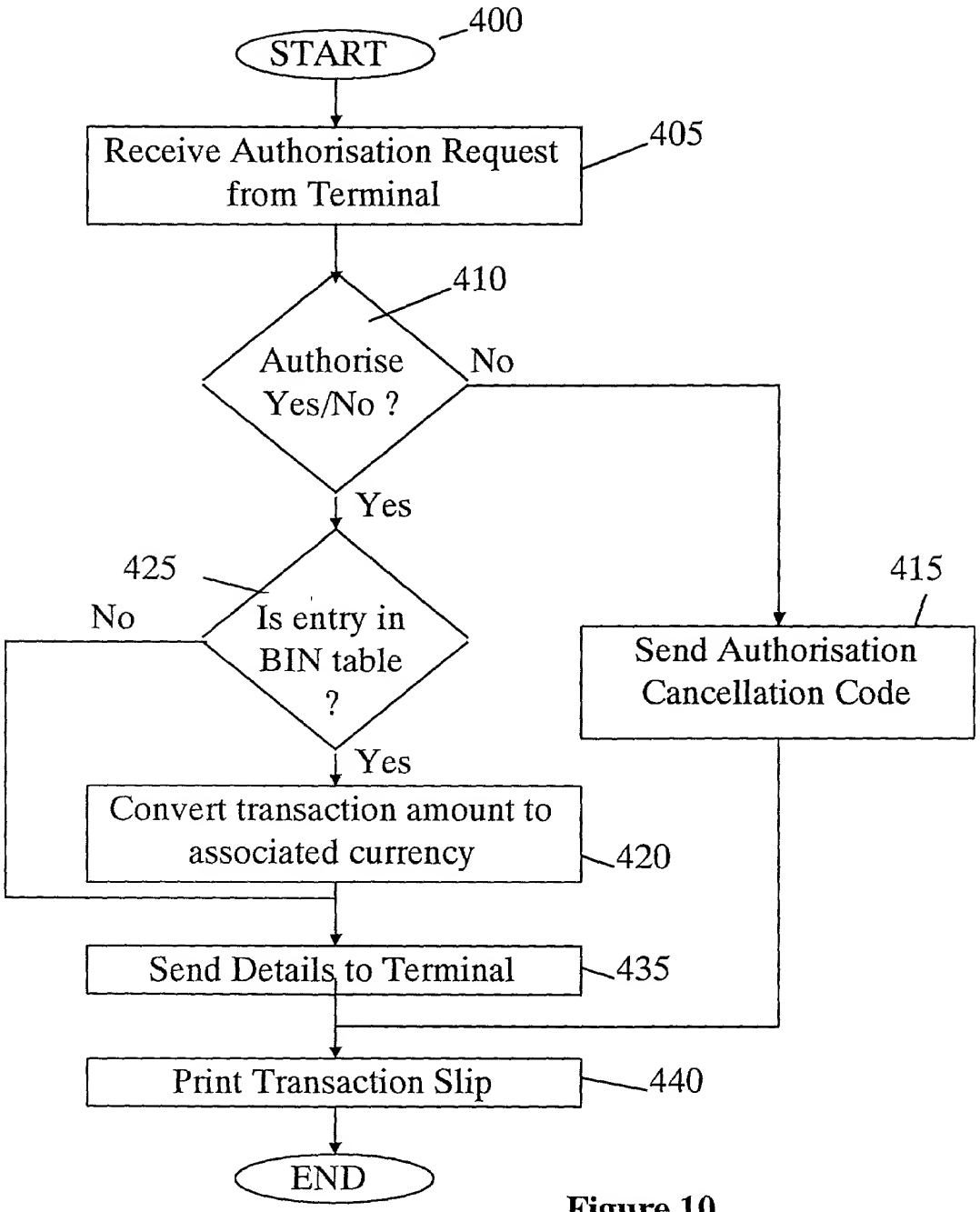


**Figure 10**

## Declaration and Power of Attorney For Patent Application

As below-named inventor, I do hereby declare that:

My residence, post office address and citizenship are as stated below.

I believe I am the original, first and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled ***DYNAMIC CURRENCY CONVERSION FOR CARD PAYMENT SYSTEMS***, the specification of which

(check one)

__X__ is attached hereto.
_____ was filed on_____ as

Application Serial No. _____

and was amended on _____
(if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

| **Prior Foreign Application(s)** | | | **Priority Claimed** | |
|---|---|---|---|---|
| S990584 (Number) | Ireland (Country) | 12 July 1999 (Day/Mo./Yr. Filed) | **X Yes** | No |
| _____ (Number) | _____ (Country) | _____ (Day/Mo./Yr. Filed) | Yes | No |
| _____ (Number) | _____ (Country) | _____ (Day/Mo./Yr. Filed) | Yes | No |

**I hereby claim the benefit under Title 35, United States Code,** §120 of any United States applications(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States Application in the manner provided by the first paragraph of Title 35, United States Code, §112, I

acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

| (Applic. S/N) | (Filing Date) | (Status--pend., pat., abandoned) |
|---|---|---|
| (Applic. S/N) | (Filing Date) | (Status--pend., pat., abandoned) |

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

**POWER OF ATTORNEY:** As named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

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